Title: Understanding Proportions and Scale Drawings

Brief Overview:

These lessons develop an understanding of proportionality and scale drawings. It also develops spatial sense. In these lessons, students will apply knowledge to solve multistep problems. The problems used in these lessons consist of using similar objects in conjunction with scale factors that relate corresponding lengths of the objects or by using the fact that relationships of lengths within an object are preserved in similar objects, as suggested by NCTM. Proportional thinking is fostered by performing activities that compare ratios and use scale models

NCTM Content Standard/National Science Education Standard:

Students will apply appropriate techniques, tools, and formulas to determine measurements by solving problems involving scale factors, using ratio and proportion.

Grade/Level:

7th – 8th

Duration/Length:

5 - 60 minute class periods

Student Outcomes:

Students will be able to:

- Understand that a ratio is a comparison of any two quantities.
- Understand that proportions are equal ratios that result from multiplication or division not addition or subtraction.
- Use proportional reasoning to solve measurement problems.
- Determine missing dimension for a figure using a scale.
- Determine the distance between 2 points using a drawing and a scale.

Materials and Resources:

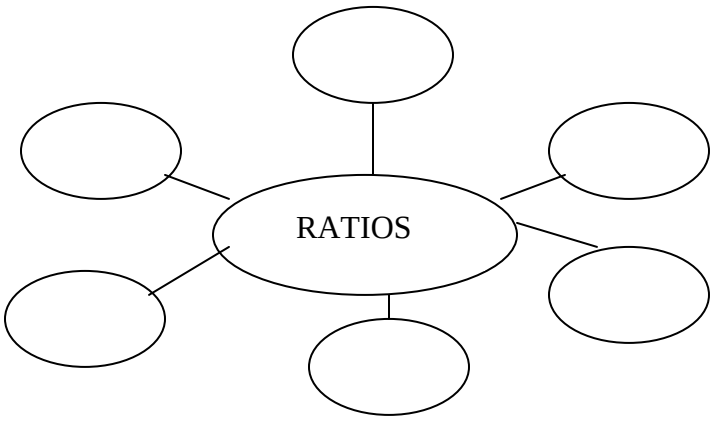
- Scissors
- Rulers
- Tape
- Stapler
- Crayons, Markers
- Cardboard (used boxes)
- Construction paper
- Paper Towel tubes (six or more)
- Websites

    - www.mapquest.com
    - www.NBA.com
- Calculator
- Transparencies
- Worksheets
    - Rectangles
    - Irregular Quadrilateral
    - Tri-ing Triangles
    - Geo-Board Sheet
    - Door Problem
    - Door Proportion
    - Tiny Tot Soccer Field Dimensions
    - Shrinkin' Basketball
    - Basketball Court Dimensions
- Teacher answer sheets

Development/Procedures:

Lesson 1 Ratios and Proportions

Preassessment – Start off with a word web to check understanding of ratios. Ask students to share the first word that comes to mind when they hear the word ratio. Add student responses to the word web. Keep the web up throughout this unit and add words periodically.



Launch – Now introduce the students to the Geo-boards. If Geo-boards are not available, use the "Geo-sheet" resource sheet. The Geo-board will be used as a tactile manipulative for the students to understand the ratio/proportion concept.

Teacher Facilitation – Place a clear Geo-board or a transparency of the Geo-board sheet on an overhead projector. Then, place a rubber band or use an overhead marker to place a square around 4 dots on the Geo-board and ask the students how many units this shape represents. Help students understand that this represents one unit. Now repeat this step around six dots which creates two units. Have students place a square around four units, which should be a placed around nine dots. Now have students place a rectangle around a shape that has a side of four units and a side of six units and ask them how many units this represents. This represents 24 units because 4 x 6 equals 24. Now have students create a shape that is half the size of the previous shape. The students should make a shape that is 2 x 3; at this point ask students how many units this new shape represents. Answer is 12 units. Discuss reasoning. Have students start again with a shape that is 4 x 6 and ask them to now create a new shape that is twice the size of original. Walk around class room and assess student's capabilities. Students should have created a shape that is 8 x 12 which equals 96 units. Discuss results.

Student Application - At this point students are being empowered to be creative with the Geo-board manipulative. They are learning how to shrink down and enlarge a shape proportionately to a previous shape.

Embedded Assessment – Have all students now use a Geo-board sheet and have them place their name on their sheet. Give them two shapes to shrink and enlarge respectively. On the overhead Geo-board transparency place a shape with a size 7 x 2 and another with a size 5 x 3, and have students increase each shape by doubling it and shrink each shape by half. Then have students turn the papers in as an exit slip.

Reteaching/Extension – After grading exit slips teacher will then know students understanding of taught material. Return graded exit slips. For those who have not completely understood the lesson, review what is needed and have them work with students that have a good understanding.

Lesson 2 Ratios and Proportions

Preassessment – At an aquarium, the ratio of rockhopper penguins to African penguins is 7 to 8. If there are 105 penguins, how many are rockhoppers?
Answer: x = 120

Launch – Before class, cut out 2 dimensional rectangles of different sizes with the measurements of 2 x 3, 4 x 6, 8 x 12, and 16 x 24. Show the students two at a time. Ask students what these rectangles have in common. Disclose the measurements to the students and probe them to look for a pattern. They should be able to recognize a multiplicative process. Make sure they understand that these geometric figures are the same shape, but not the same size. Therefore, they are **similar** and not **congruent.**

Teacher Facilitation – Give students a copy of ”Rectangles” and “Irregular Quadrilaterals” or a dot or grid paper with an irregular quadrilateral drawn at a small size. Challenge the students to draw similar shapes, but they must be larger than the original shape. How many similar shapes can they draw on this grid? This activity will develop the concept of equivalent ratios. Make sure that students label the lengths of the sides in units. Then, compare the lengths of different sides. Sides should correspond and the ratio of two sides of one quadrilateral should be comparable to the two sides in the other quadrilateral.

Student Application – Tri-ing Triangles
Divide the class into pairs, and have each pair of students cut out the ten triangles from “Tri-ing Triangles.” Have each group of students divide the triangles into three groups of three with one not belonging to any group according to similarity and proportionality. As you circle the room, have each group verbally explain their reason for their grouping. Help students recognize that the similar figures have congruent angles.

Embedded Assessment – Determine each student’s progress by assessing verbal reasoning skills as well as visualizing the concept of proportions. After they have grouped the triangles, allow students to take measurements of the base and the height of each triangle and record on a chart. Have them divide the smaller side by the larger side to get the ratio in decimal form or have them simplify each ratio then

compare them to decided if their grouping should remain the same or should they adjust it. They should discover that if groups are composed of similar triangles then the ratios / proportions will be equivalent.

Reteaching/Extension –

For those who have not completely understood the lesson, pull them in a small group and work on process charts to keep in their notebooks and also perform sample problems related to realistic situations.
For those who have understood the lesson, have them work on proportions involving fractions and decimals.

Homework-
Assign students to bring in old shoe boxes for an activity in Lesson 4.

Lesson 3 Proportions and Scale Drawings

Preassessment – A person who weighs 95 pounds on Earth would weigh 19 pounds on another planet. How much would a 60 pound dog weigh on that planet?

Answer: x = 12

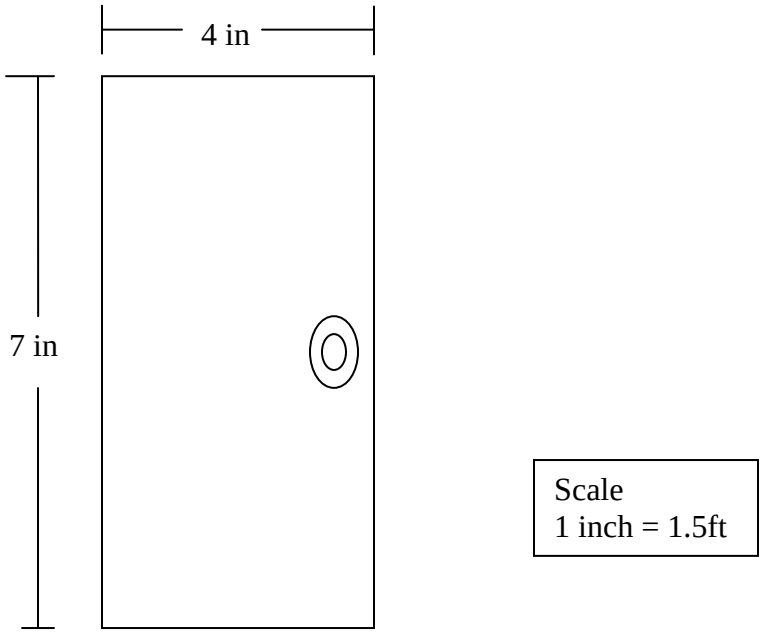
Launch – Display and compare variety of objects such as model cars, dollhouse, insects, dollhouse furniture, and. a globe of the Earth. Ask students if the sizes of these objects are realistic. Students should respond that they are not. Elicit students to give an explanation of approximate real measurements of the objects in inches. Have the actual measurements of the objects available for both the original size and its smaller size or larger size. Introduce the word scale.

Teacher Facilitation – Discuss scale and how it relates to ratios. Explain that a ratio is a comparison of two quantities that can be expressed as a fraction, decimal, or percent. Scale is related to ratios because a figure can be enlarged based on what is known as a scale factor. A scale factor is a number used to transform a small figure into a larger figure or vice versa. A scale factor number is used to multiply both parts of the ratio to create an equal ratio. (Infinite equivalent ratios are possible.)

For example, a figure can be enlarged by a scale factor of 2. So if the ratio of the smaller figure is 1:2, then the ratio of the larger figure is 2:4.

As a second example, show a map of Maryland. Download a Baltimore/ Annapolis map using www.mapquest.com. Identify the distance from Baltimore to Annapolis. First use inches to measure the distance from Baltimore to Annapolis. Ask the students if the two cities are really that many inches apart, and to explain their reasoning. Point out the map's scale, which converts inches to miles. Ask, "What is the actual distance from Baltimore to Annapolis?" Guide the students through the mathematics to determine the answer.

Present the following scenario: "I want you to help me build a door for my house for community service hours." Draw a scale drawing of the door on the board. In a scale drawing of the door, label the length as 4 in and the width as 7in. Then, include the scale of 1 in = 1.5 ft. Give the students a copy of "Door Problem" and challenge the students to find the actual measurements of the door.



Give students wait time to figure out the actual length of the door. Students will add or multiply to discover exact length and width. Invite a student to explain how they would solve this problem. Then, explain that they are using proportions. Allow the students to complete the "Door Proportions" worksheet during this instruction. Let x represent the actual length of the door and write a proportion.

$$\frac{\text{Scale (Smaller)}}{\text{Scale (Larger)}} = \frac{\text{Drawings' length}}{\text{Actual Length}}$$

To find the length the proportion is as follows:

$$\frac{1 \text{ in}}{1.5 \text{ ft}} = \frac{4 \text{ in}}{x}$$

Cross multiply $1\text{in} \cdot x = 1.5 \cdot 4$

Multiply $x = 6$ ft

Length is 6 ft.

To find the width, solve the proportion as follows:

$$\frac{1 \text{ in}}{1.5 \text{ ft}} = \frac{6 \text{ in}}{x}$$

Cross multiply $1\text{in} \cdot x = 1.5 \cdot 6$

Multiply $x = 9$ ft

Width is 9 ft.

Student Application - Thank the students for assisting you with your door measurements. Then explain that you need help with one more thing. Let them know that you are a soccer coach for tiny tots, 3, 4, and 5 year olds. Let them know that your team plays on a field (do not tell them the dimensions are 60 yd by 40 yd), but 4 games are able to be played on this field simultaneously. Ask them to help you find the dimensions of the soccer field for one game for Tiny Tots, if the scale is 1 in = 7.5 yd. Distribute "Tiny Tot Soccer Field Dimensions," and have the students complete the activity.

Embedded Assessment --Have students find the true dimensions of the field using the scale drawing and scale. After finding the dimensions in yards, ask the students if they answered the question. They will assume that they have, however the question asked what the dimensions were of one out four fields on the whole field. Students should be able to use their spatial reasoning skills to recognize that the length and width should be cut in half. Therefore, the dimensions are length is 30 yd and width is 20 yd.

Reteaching/Extension--

Have students complete homework assignment to reteach and practice See Worksheet for solving problems using scales and scale drawings.

To extend this lesson, students may use the meter measurements of the soccer field, length is 55m and the width is 36.6 m. Give them the length of 8 inches and the width of 5.5 inches with the scale changing to 1 in = 6.875 meters.

Lesson 4 Shrunken Baller's (Proportions and Scale Drawings)

Preassessment – Refresh students on the whole concept of shrinking an object proportionally. Place a five minute warm up on the board asking students, "If a foreign country shrunk NBA players with a shrink bomb (which shrunk everyone by $1/8^{th}$) right before the 2008 Olympic Games. How tall would a player that was originally 6 feet 5inches be after he was hit with the shrink bomb? Make sure students find answers in inches. The students should have multiplied 6 feet by 12 and then added the 5 inches and received 77 inches and then divide by 12 and received 6.4 inches (round to nearest tenth) as the final answer.

Launch – Segway into the launch which is to teach students to take the knowledge they have learned with proportions and use it in a fun, practical, and interactive way. Let students know that the goal today is to shrink the NBA players, basketball court, backboard and the rim. Then when each group is done they will use construction paper, cardboard (have several boxes handy), crayons or markers, and paper towel tubes to construct an actual shrunken basketball court with players.

Teacher Facilitation – Prior to class, heterogeneously place students into groups of five. Place students who are having difficulty understanding together with students who understand well to encourage teamwork. Then, distribute the worksheets "Shrikin' Basketball." Giving a different basketball team worksheet to each team. Have each team member place their respective name on top of the worksheet. When they are done let them know that the number that is next to their name represents the number of the basketball player that they will be responsible to calculate the shrunken height of. Use class computers to allow each team to go to www.NBA.com and to click the team tab to find respective team and original heights of the players on their team. While other teams are waiting to use the computer pass out "Basketball Court Dimensions" worksheet for the court, backboard and height of the rim which also must be shrunk by 1/8 and converted to inches. Groups should shrink these down together while they are waiting to go on line to get player's heights. Check group's progress with answer sheet and guide them to success.

Student Application – Students are now applying what they learned about proportions in a well functioning team in a fun interactive way. This activity encourages independent work and teamwork.

Embedded Assessment – Students should check each of their group member's results to make sure their NBA players are shrunken to the correct size. Circulate around the class with answer sheets and assess if groups are working well together and coming up with the correct answers. If teams are not getting the correct answers guide them to success with one or two of their player's, then allow them to correct the rest as a group.

Reteaching/Extension- After teacher check and guide each group to success then have students pick up corresponding construction paper colors that represent their team colors. Each group should have scissors, tape, a stapler, markers, crayons, paper towel tubes, and cardboard. At this point instruct students to construct their individual shrunken basketball players with appropriate measurements. Teacher should try not to give a lot of instruction at this time, allowing students to be creative. As students individually finish their basketball players place them in new groups and begin construction of one basketball court. A

suggestion of groups can be; 1) two groups of three students responsible to construct the shrunken backboards and rims respectively. Remember: circumference of rim is not important. 2) Two groups of three students responsible to construct two shrunken half courts respectively (which will be fastened together when completed). 3) Again allow students to be creative. When students are all finished conclude lesson by explaining to them that they have successfully constructed a $1/8^{th}$ model of a basketball court and players. Also let them know that this is actually a "real world" occupation that gets paid generously.

Summative Assessment:

At the conclusion of these lessons, students should be given an assessment that includes problems ranging from identifying equivalent ratios, solving for proportions, and using scale factors.

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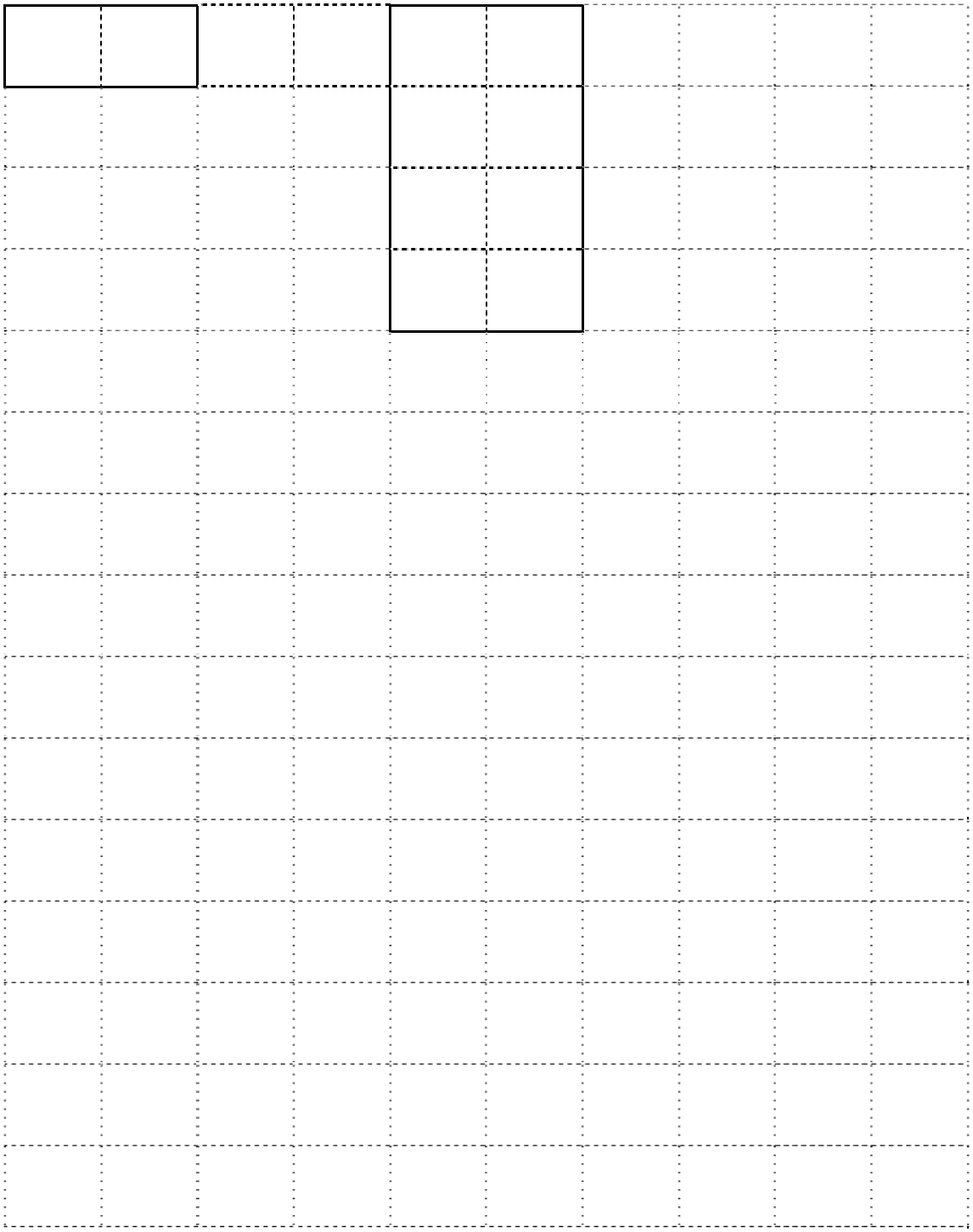
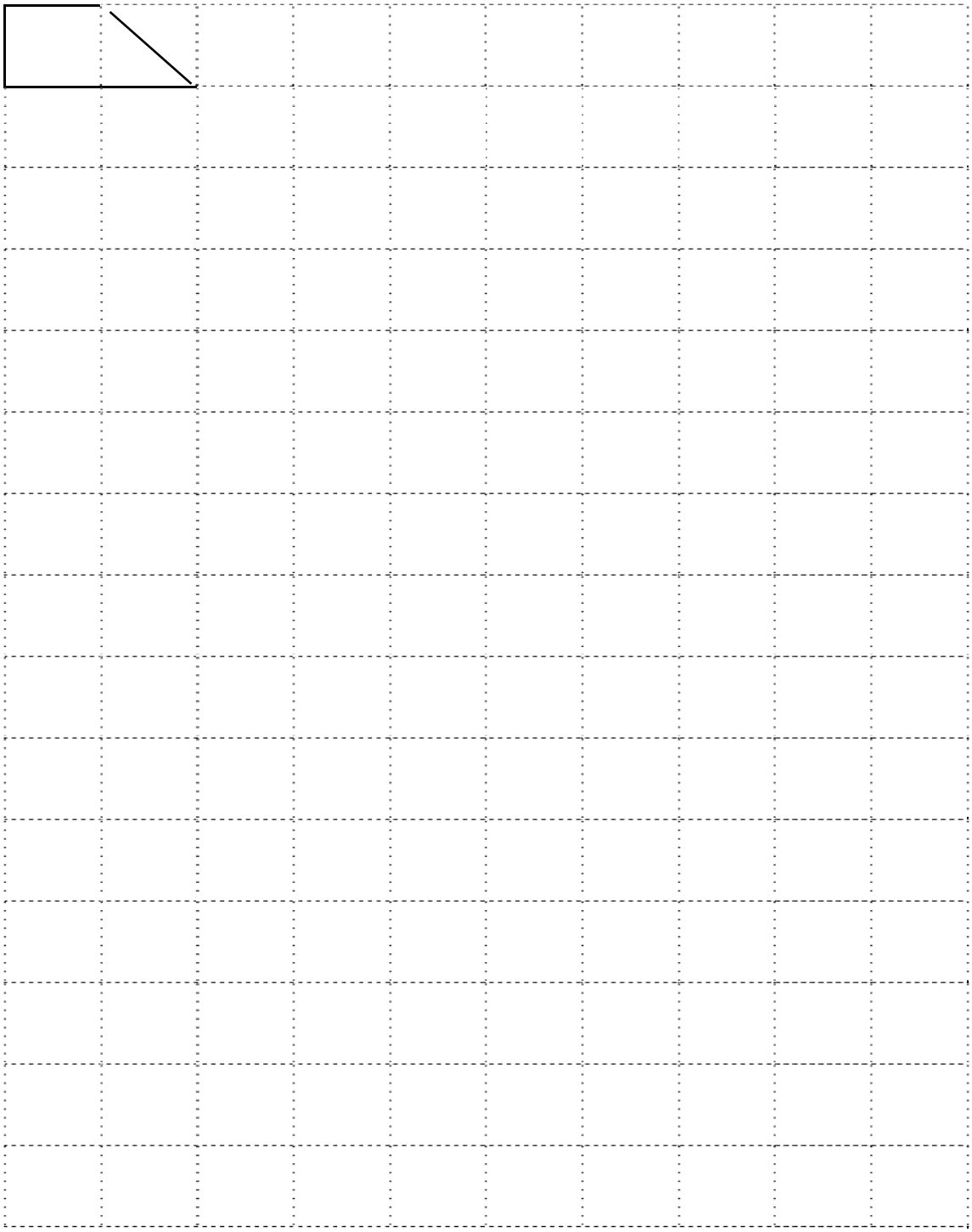
Rectangles Name: _____

Directions: Draw similar, larger rectangles on the grid paper.

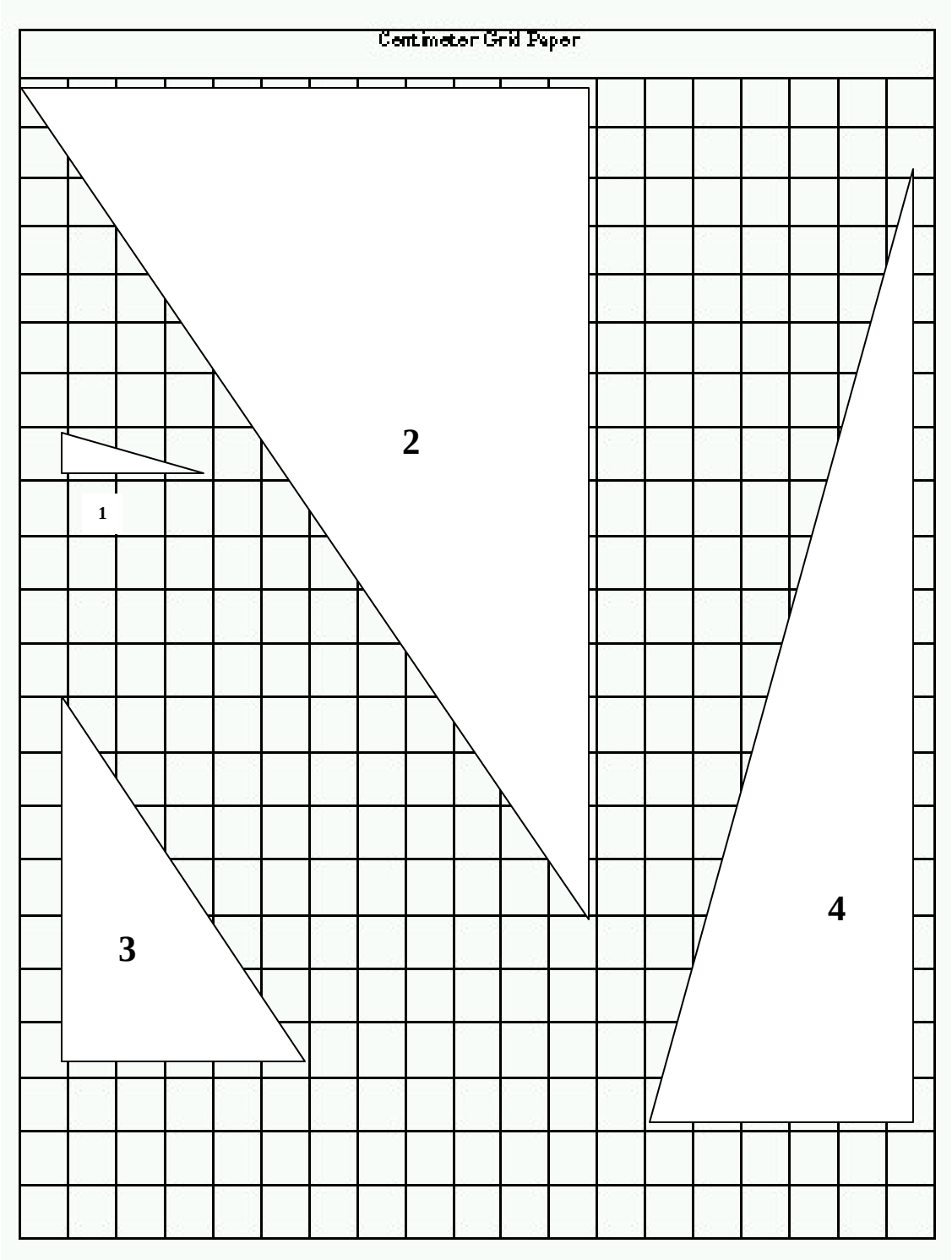


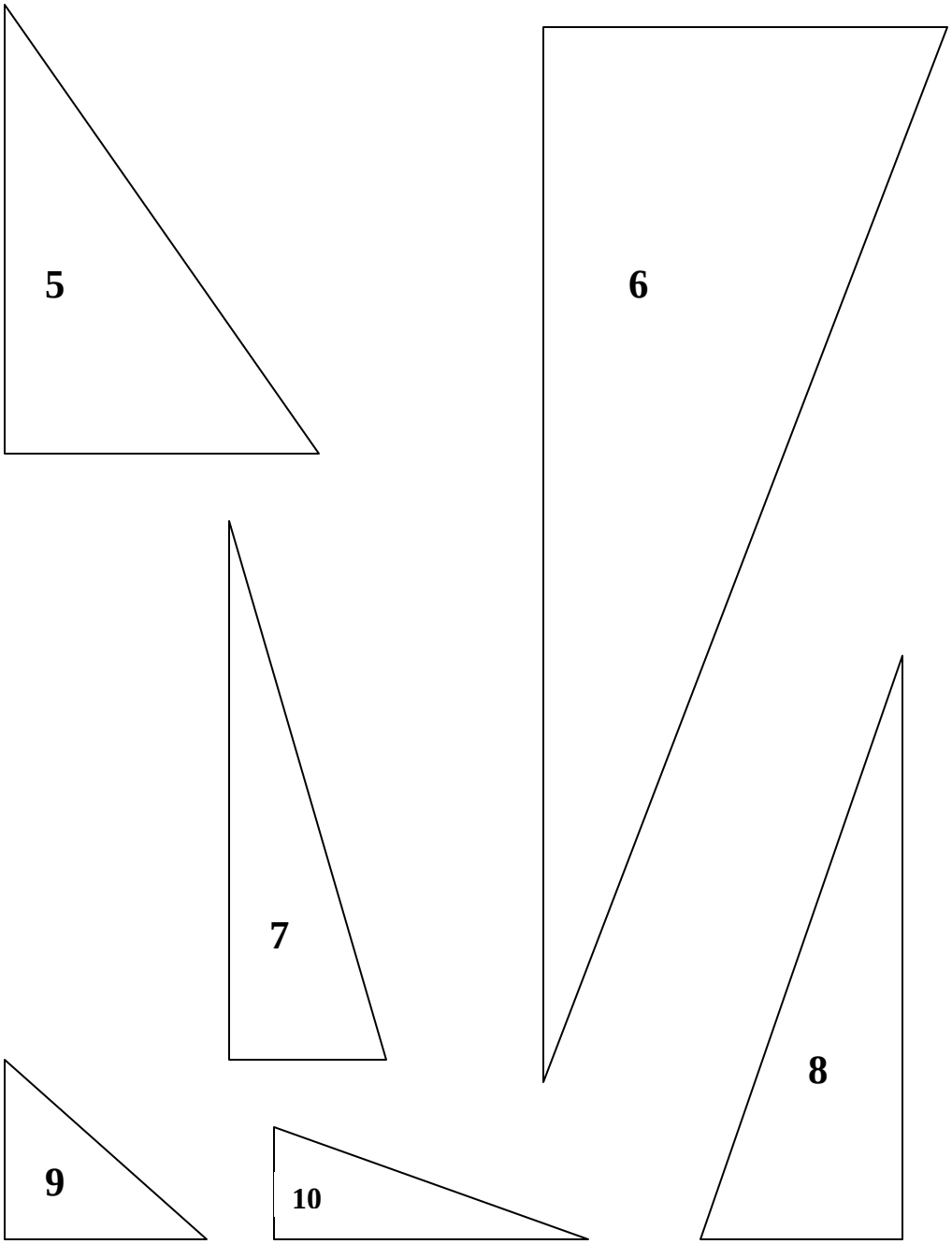
Irregular Quadrilaterals Name: _____

Directions: Draw similar, larger quadrilaterals on the grid paper.



Tri – ing Triangles

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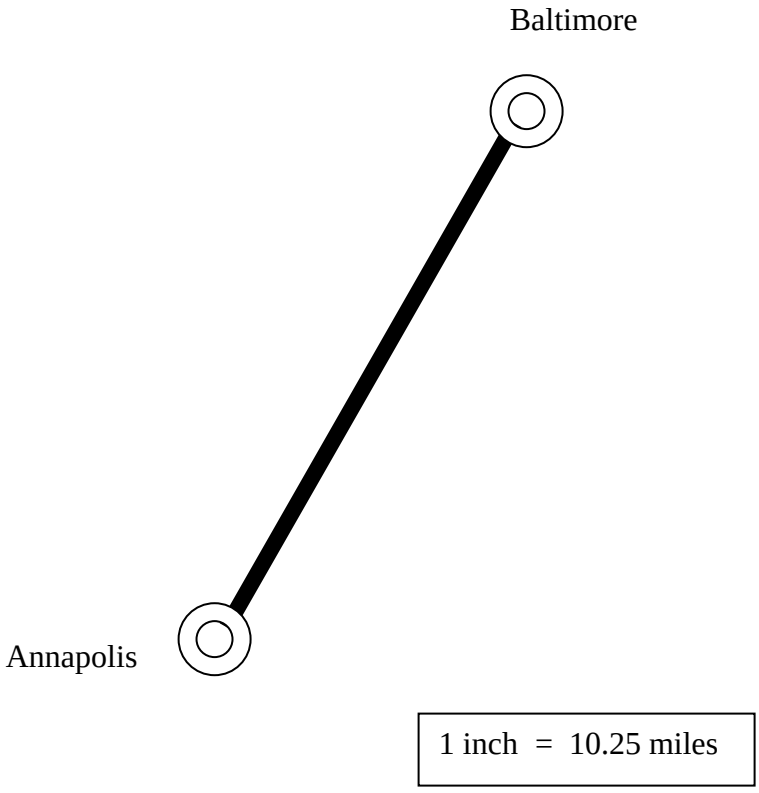
Lesson 3 Proportions and Scale Drawings

Teacher Resource (Transparency)

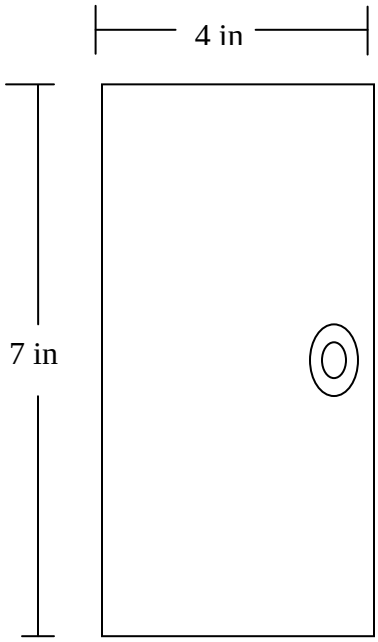


Student Page

Name _____ Date _____

Door Problem

Your teacher needs help finding the actual dimensions of this door for her house. Can you help?



Scale
1 inch = 1.5ft

What is the actual length of the door? (Use the work space below.)

Student Handout

Name _____ Date _____

Door Proportions

Now use proportions to solve for the dimensions in the scale drawing of the door.

Scale (Smaller) = Drawings' length

Scale (Larger) Actual Length

*Find the length and let x represent the actual length of the door. The proportion is:

_____ = _____

-Cross multiply below.

Length is _____.

*Find the width and let x represent the actual width of the door. The proportion is:

_____ = _____

-Cross multiply below.

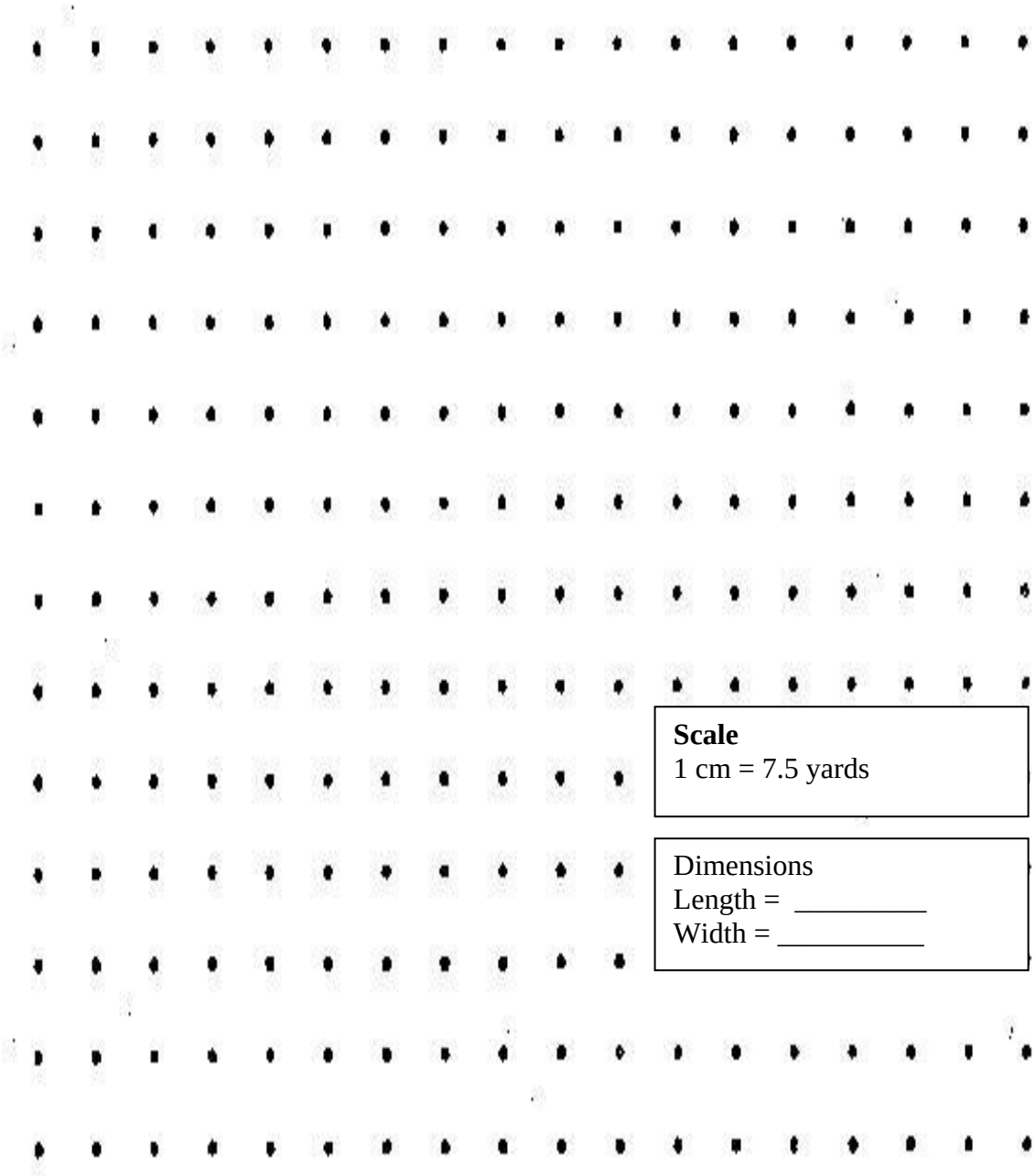
Width is _____.

Student Handout Lesson 3

Name _____ Date _____

Tiny Tot Soccer Field Dimensions

Directions: Help the Tiny Tots soccer coach measure the dimensions of the soccer field. On the grid below, use a metric ruler to draw a rectangular field with the dimensions of 8inches for the length and 5.5 inches for the width.



Student Page
Name _____ Date _____

BCR
Using the scale drawing that you created, what are the actual dimensions of the soccer field for Tiny Tots if four games can be played at one time on the same field?

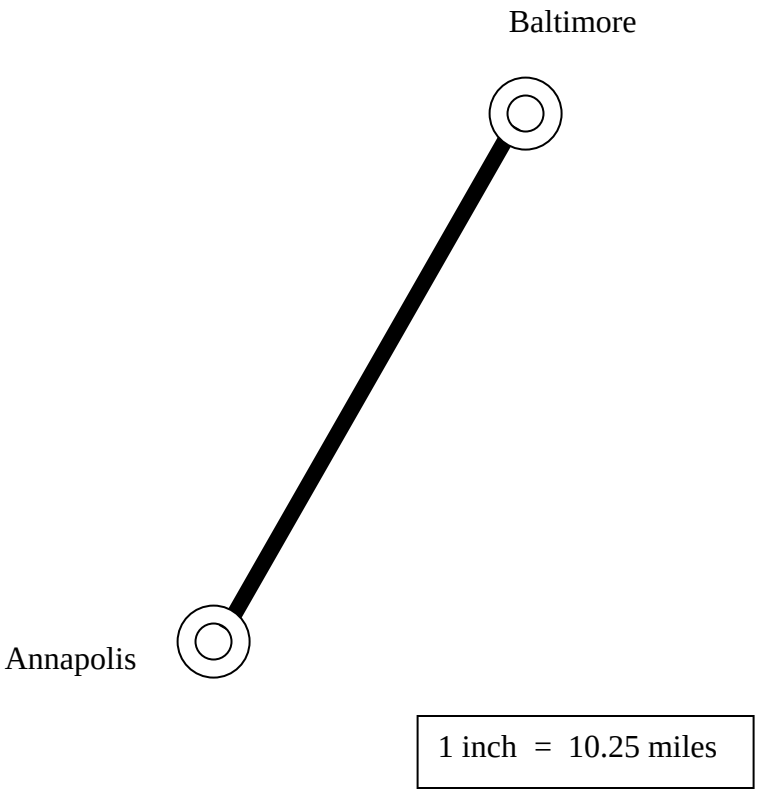
Show all work below:

Using what you know about scale drawings and proportions to explain how you found your answer. Use words, symbols, or numbers in your answer.

Answer Sheet Lesson 3

Lesson 3 Proportions and Scale Drawings

Teacher Resource (Transparency)



Measurement from Baltimore to Annapolis is 3 inches. Let x represent the miles that are unknown. Set up the proportion:

$$\frac{1 \text{ in}}{10.25 \text{ mi}} = \frac{3 \text{ in}}{\mathbf{x}}$$

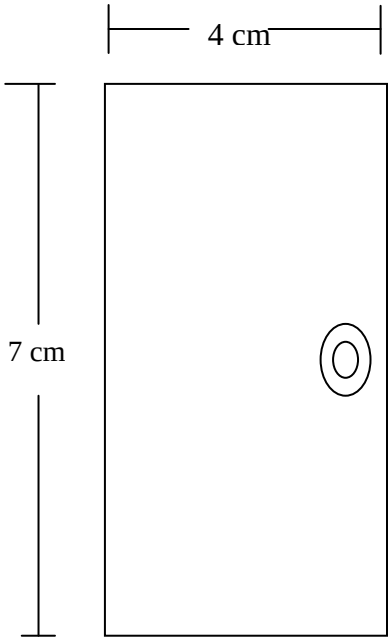
$$\mathbf{1 \cdot x = 10.25 \cdot 3}$$

$$\mathbf{X = 30.75 \text{ miles}}$$

Answer Sheet Lesson 3
Student Page
Name _____ Date _____

Door Problem

Your teacher needs help finding the actual dimensions of this door for her house. Can you help?



Scale
1 cm = 1.5ft

What is the actual length of the door? (Use the work space below.)

Answer Sheet Lesson 3
Student Handout

Name _____ Date _____

Door Proportions

Now use proportions to solve for the dimensions in the scale drawing of the door.

Scale (Smaller) = Drawings' Width / Length

Scale (Larger) Actual Width / Length

*Find the width and let x represent the actual width of the door. The proportion is:

$$\frac{1 \text{ in}}{1.5 \text{ ft}} = \frac{4 \text{ in}}{\mathbf{x}}$$

-Cross multiply below.

$1 \cdot x = 1.5 \cdot 4$

$X = 6$ ft

Width is 6 ft .

*Find the length and let x represent the actual length of the door. The proportion is:

$$\frac{1 \text{ in}}{1.5 \text{ ft}} = \frac{6 \text{ in}}{x}$$

-Cross multiply below.

$1 \cdot x = 1.5 \cdot 6$

$X = 9$ ft

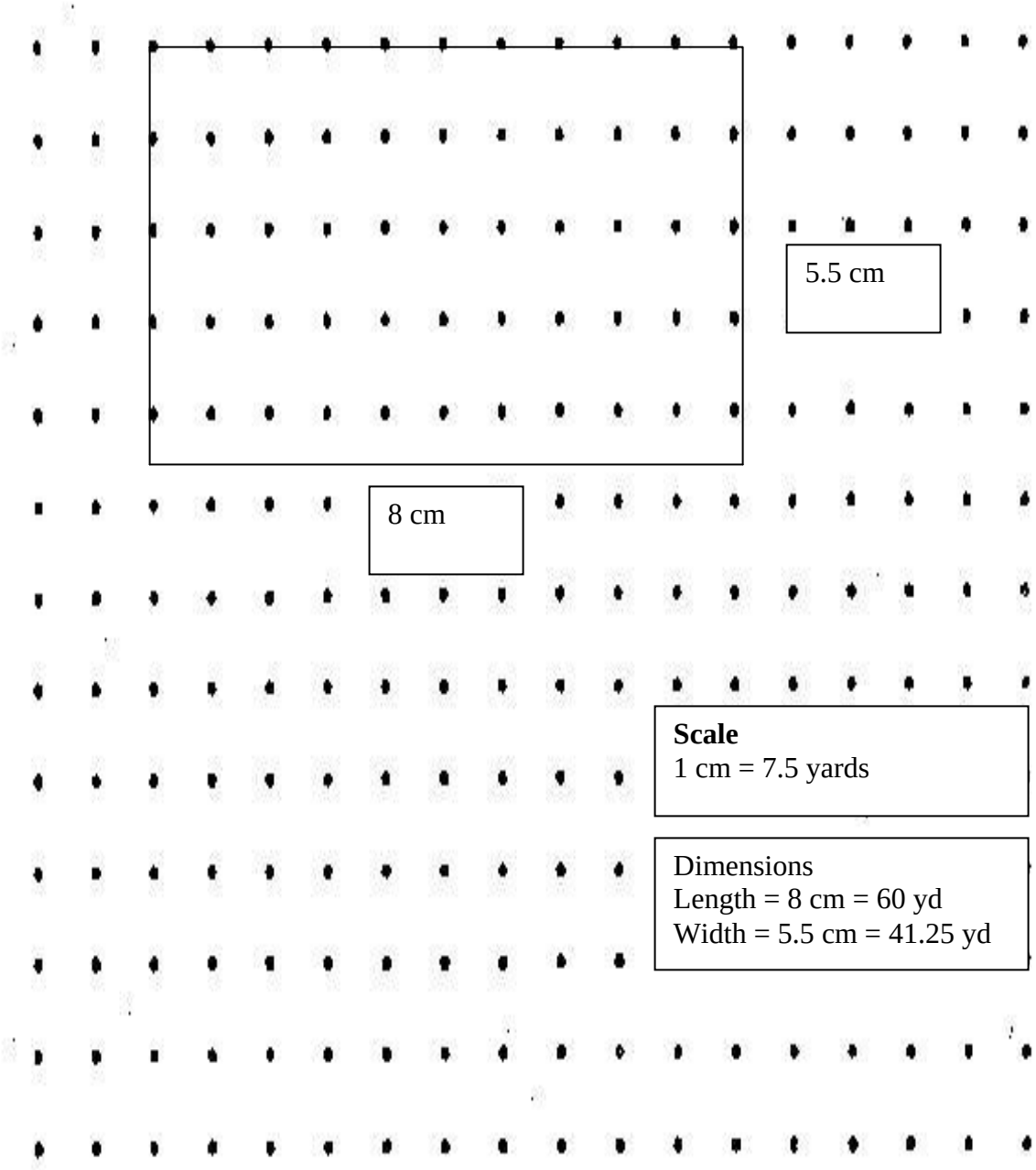
Length is 9 ft.

Answer Sheet Lesson 3

Name _____ Date _____

Tiny Tot Soccer Field Dimensions

Directions: Help the Tiny Tots soccer coach measure the dimensions of the soccer field. On the grid below, use a metric ruler to draw a rectangular field with the dimensions of 8inches for the length and 5.5 inches for the width.



Answer Sheet Lesson 3

Name _____ Date _____

BCR
Using the scale drawing that you created, what are the actual dimensions of the soccer field for Tiny Tots if four games can be played at one time on the same field?

Show all work below:

Length = $\frac{1 \text{ cm}}{7.5 \text{ yd}} = \frac{8 \text{ cm}}{x}$

$1 \cdot x = 7.5 \cdot 8$

$X = 60 \text{ yd}$

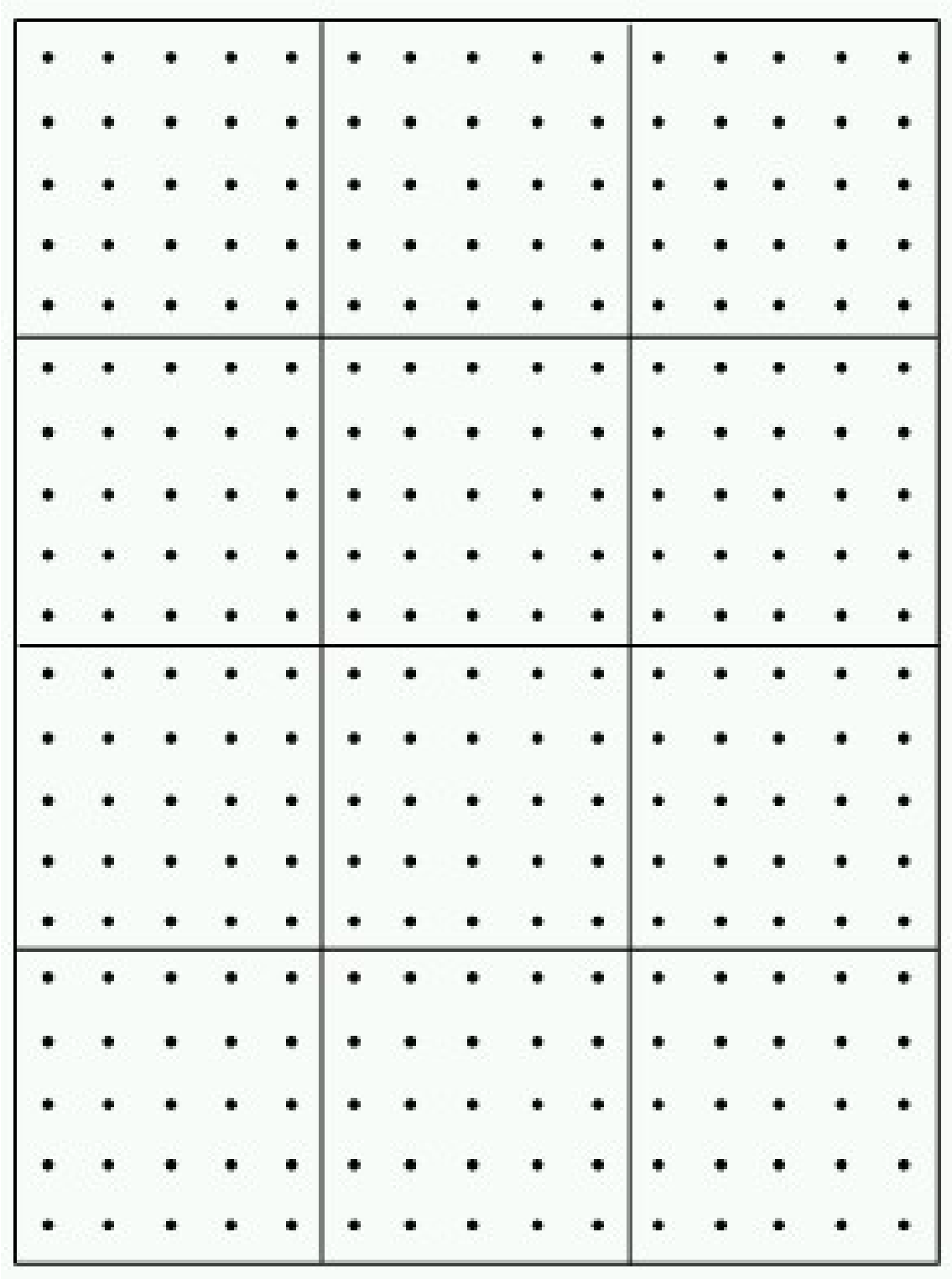
Width: $\frac{1 \text{ in}}{7.5 \text{ cm}} = \frac{5.5 \text{ in}}{x}$

$1 \cdot x = 7.5 \cdot 5.5$

$x = 41.25 \text{ yd}$

Using what you know about scale drawings and proportions to explain how you found your answer. Use words, symbols, or numbers in your answer.

GEO-BOARD SHEET



Team Names: 1) 2)
3) 4) 5)

Date: Class:

BOSTON CELTICS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Kevin Garnett			
2. Paul Pierce			
3. Ray Allen			
4. Rajon Rando			
5. Paul Pierce			

TEACHER ANSWER SHEET

BOSTON CELTICS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Kevin Garnett	**6' 11"**	**6 x 12 + 11= 83"**	**10.4 "**
2. Paul Pierce	**6' 7"**	**6 x 12 + 7= 79"**	**9.9"**
3. Ray Allen	**6' 5"**	**6 x 12 + 5=77"**	**9.6"**
4. Rajon Rando	**6' 1"**	**6 x 12 + 1=73"**	**9.1"**
5. Paul Pierce	**6' 7"**	**6 x 12 + 7=79"**	**9.9"**

Team Names: 1) 2)
3) 4) 5)

Date: Class:

L.A. LAKERS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Kobe Bryant			
2. Pau Gasol			
3.Lamar Odom			
4. Derek Fisher			
5. Viadimir Radmanovic			

TEACHER ANSWER SHEET

L.A. LAKERS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Kobe Bryant	**6'6"**	**6x12+6=78"**	**9.8"**
2. Pau Gasol	**7'**	**7x12=84"**	**10.5"**
3.Lamar Odom	**6'10"**	**6x12+10=82"**	**10.3"**
4. Derek Fisher	**6'1"**	**6x12+1=73"**	**9.1"**
5. Viadimir Radmanovic	**6'10"**	**6x12+10=82"**	**10.3"**

Team Names: 1) 2)
3) 4) 5)

Date: Class:

WASHINGTON WIZARDS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Caron Butler			
2. Antawn Jamison			
3.Deshawn Stevenson			
4. Brendan Haywood			
5. Gilbert Arenas			

TEACHER ANSWER SHEET

WASHINGTON WIZARDS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Caron Butler	**6'1"**	**6x12+1=73"**	**9.1"**
2. Antawn Jamison	6'9"	6x12+9=81"	**10.1"**
3.Deshawn Stevenson	**6'5"**	**6x12+5=77"**	**9.6"**
4. Brendan Haywood	**7'**	**7x12=84"**	**10.5"**
5. Gilbert Arenas	**6'4"**	**6x12+4=76"**	**9.5"**

Team Names: 1) 2)
3) 4) 5)

Date: Class:

DENVER NUGGETS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Allen Iverson			
2. Camelo Anthony			
3. J.R. Smith			
4. Linas Kleiza			
5. Kenyon Martin			

TEACHER ANSWER SHEET

DENVER NUGGETS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Allen Iverson	**6'**	**6x12=72"**	**9"**
2. Camelo Anthony	6'8"	6x12+8=80"	**10"**
3. J.R. Smith	**6'6"**	**6x12+6=78"**	**9.8"**
4. Linas Kleiza	**6'8"**	**6x8+8=80"**	**10"**
5. Kenyon Martin	**6'9"**	**6x8+9=81"**	**10.1"**

Team Names: 1) 2)
3) 4) 5)

Date: Class:

MIAMI HEAT

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Dwayne Wade			
2. Shawn Marion			
3. Ricky Davis			
4. Udonis Haslem			
5. Marcus Banks			

TEACHER ANSWER SHEET

MIAMI HEAT

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Dwayne Wade	**6'4"**	**6x12+4=76"**	**9.5"**
2. Shawn Marion	6'7"	6x12+7=79"	**9.9"**
3. Ricky Davis	**6'7"**	**6x12+7=79"**	**9.9"**
4. Udonis Haslem	**6'8"**	**6x12+8=80"**	**10"**
5. Marcus Banks	**6'2"**	**6x12+2=74"**	**9.3"**

Team Names: 1) 2)
3) 4) 5)

Date: Class:

N.Y. NICKS

Find at www.NBA.com, team tab

Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Jamal Crawford			
2. Zack Randolph			
3.Stephon Marbury			
4. Eddy Curry			
5. Nate Robinson			

TEACHER ANSWER SHEET

N.Y. NICKS

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Baller's Name	**Original Height (OH)**	**In Inches = (OH x 12 + In)**	**Shrunken Height In Inches to the nearest tenth (OH / 8)**
1. Jamal Crawford	**6'5"**	**6x12+5=77"**	**9.6"**
2. Zack Randolph	6'9"	6x12+9=81"	**10.2"**
3.Stephon Marbury	**6'2"**	**6x12+2=74"**	**9.2"**
4. Eddy Curry	**6'11"**	**6x12+11=83"**	**10.4"**
5. Nate Robinson	**5'9"**	**5x12+9=69"**	**8.6"**

BASKETBALL COURT DIMENSIONS

NBA	**Original Measurements (OM)**	**In Inches = (OM x 12 + In)**	**Shrunken Measurements In Inches to the nearest tenth (OH / 8)**
1. Court	**94'L x 50'W**		
2. Half Court	**47'L 50'W**		
3. Backboard	**6'W x 3'5"L**		
4. From ground to top of rim	**10'H**		

BASKETBALL COURT DIMENSIONS

TEACHER ANSWER SHEET

NBA	**Original Measurements (OM)**	**In Inches = (OM x 12 + In)**	**Shrunken Measurements In Inches to the nearest tenth (OH / 8)**
1. Court	**94'L x 50'W**	**94' x 12=1128"L** **50' x 12=600"W**	**141"L x 150"W**
2. Half Court	**47'L 50'W**	**47' x 12=564"L** **50' x 12=600"W**	**70.5"L x 75"W**
3. Backboard	**6'W x 3'5"L**	**6' x 12=72"W** **3' x 12 + 5=42"L**	**9"W x 5.3"L**
4. From ground to top of rim	**10'H**	**10' x 12=120"**	**15"H**

Summative Assessment

1) BCR: The distance between two cities is 3.5 inches on a map with a scale of 1 inch = 20 miles.

Part A
What is the actual distance between the two towns?

Part B
Use what you know about scales to explain your answer. Use words, numbers, and/or symbols in your explanation.

2) BCR: If a turtle moves 5 inches in 2 hours.

Part A
How far could he travel in a day?

Part B
Use what you know about proportions to explain your answer. Use words, numbers, and/or symbols in your explanation.

3) Use lines to connect equivalent ratios:

1/2	4/12
3/4	20/100
2/6	25/75
5/25	20/40

4) BCR: Michael is building a scale model of a basketball player. He is using the scale of 1 : 8.

Part A
How tall is the model if the actual player is 10 feet tall?

Part B
Use what you know about scale drawing to explain your answer. Use words, numbers, and/or symbols in your explanation.

Summative Assessment

TEACHER ANSWER SHEET

1) BCR: The distance between two cities is 3.5 inches on a map with a scale of 1 inch = 20 miles.

Part A
What is the actual distance between the two towns? Answer = 70 miles

Part B
Use what you know about scales to explain your answer. Use words, numbers, and/or symbols in your explanation.

2) BCR: If a turtle moves 5 inches in 2 hours.

Part A
How far could he travel in a day? Answer = 60 Inches

Part B
Use what you know about proportions to explain your answer. Use words, numbers, and/or symbols in your explanation.

3) Use lines to connect equivalent ratios:

1/2	4/12
3/4	20/100
2/6	25/75
5/25	20/40

Answers:
1/2 = 20/40, 3/4 = 25/75, 2/6 = 4/12, 5/25 = 20/100

4) BCR: Michael is building a scale model of a basketball player. He is using the scale of 1 : 8.

Part A
How tall is the model if the actual player is 10 feet tall? Answer = 1.25 ft

Part B
Use what you know about scale drawing to explain your answer. Use words, numbers, and/or symbols in your explanation.